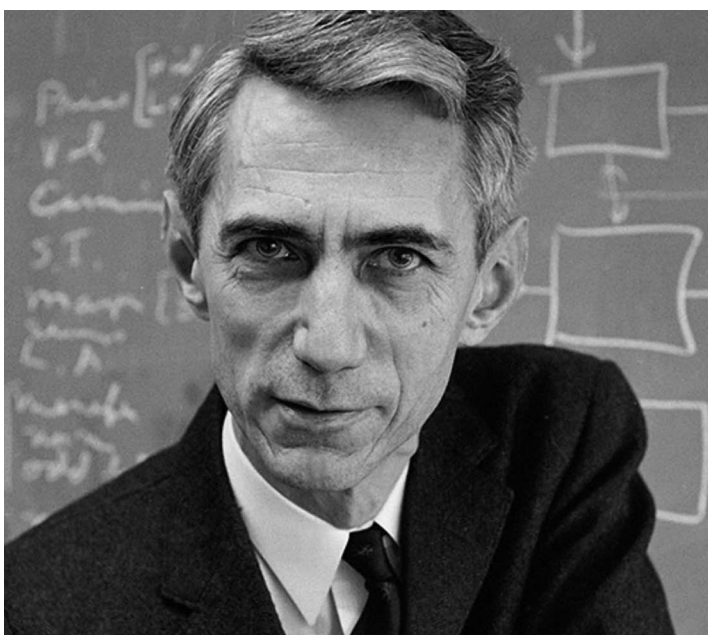
Remembering Claude Shannon

by Michael P. Salem

The IEEE Information Theory Society launched a global initiative to commemorate Claude Shannon's centenary in 2016. This was part of an IEEE effort to pay due tribute to accomplished names whose venerable contributions have shaped our profession. Practically speaking, the world we live in today owes a lot to Shannon.

Shannon greatly influenced technology and digital communications in such a way that has rightfully earned him the nickname, the "father of the Information Age." This man gave the world machine learning and information theory. His work paved the way for the creation of the knowledge-intensive societies we live in today. He put together the fundamental theoretical basis for how we communicate, store, secure, analyze, and measure information in the digital world. He was even behind representing information in 1s and 0s earning him the moniker, "father of the bit." (A bit is also known as a *shannon*.)



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Shannon belongs to an elite league of scientists whose impact on the world made them game changers in the history of engineering and technology. You can actually link the communication technology advancement we currently use to his work. Furthermore, years after his death, you can literally listen to his voice speaking of his work in interviews featured in a recollection at the IEEE Engineering Technology and History website (ethw.org). This is made possible by the technology he put together.

I was fortunate enough to participate in this effort through being part of the organizing team (which consisted of graduate students, IEEE Student Branch members, and staff) of the Information Theory Day on 27 April 2016 at the University of Balamand in Lebanon. This was the only celebration of the centenary in the Middle East that was registered with the IEEE Information Theory Society. We didn't want to hold an academic conference or a lecture series. Rather, our aim was to expose more than 75 high school students to the scale of Shannon's contributions and the variety of ways he impacted the technology we use today with a special focus on information theory. This was to be done in a simple, fun, and relevant way. The key challenge was to simplify the concepts to make them more attractive and easier to retain.

What was quite remarkable about this day was the exchanges we had with high school students. As they toured a photo and poster exhibition, the students conversed with us on different concepts at each stand. They showed a genuine interest in the information to which they were exposed.

At the end of the day, Prof. Chafic Mokbel, the faculty member heading the organizing team, prepared a short quiz, which consisted of questions one would see in

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High school students worked to decipher a Caesar cipher, calculate entropy, and perform binary arithmetic operations.

Information Theory Day at the University of Balamand, Lebanon, exposed students to the scale of Shannon's contributions, with a special focus on information theory.

university exams. We were really impressed to see students working hard with their friends to figure out solutions. We witnessed high school students decipher a Caesar cipher, calculate entropy, and perform binary arithmetic operations.

Science is worthy

This day showed that the disconnection we feel between younger teenagers and science is not due to a lack of interest. Teenagers are growing up in a world where they are bombarded with all sorts of information. This makes it more difficult to get a particular message through. However, curiosity is there, and it is our responsibility to create new media to present information in ways that will capture attention, nurture curiosity, and spark interest.

It is not difficult to expose the public to worthy science. This can only happen if we, as engineers and technologists, take it upon ourselves to disseminate knowledge pertinent to our fields in ways that are interesting and attractive to the general audience. We cannot let engineering be just math and physics. At the end of the day, it is all about innovation, engagement, and change, which is what Shannon, Alan Turing, and many others accomplished. However, we should not wait for movies to be made for people to recognize the value of science.

Shannon once wrote, "We may have knowledge of the past but cannot control it; we may control the future but have no knowledge of it." Only through profound understanding of our past, and the knowledge created in it, can we move forward as individuals and as humanity. Therefore, it is imperative that we honor those who have contributed the technologies and knowledge we often take for granted. We should teach our younger generations not to overlook the human skill and intelligence that created these technologies in the first place. While technology may be driving our world today, we must remember that it is human skill and intellect that made all of this possible in the first place.

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The world created by Shannon, Turing, and others has taught us that technology will not replace human skill. Rather, it will create new worlds of opportunities that require new skills and innovative ways of thinking to build and develop. They taught us that with determination and mastery of one's field, the chances are limitless. This is what we should impart on our younger generations as we teach them science and technology. They should be taught that learning these subjects is not in end by itself but rather a tool they will need to innovate in the future they will build.

About the author

Michael P. Salem (michael.p.salem@gmail.com) holds a B.S. degree in computer engineering and an M.Sc. degree in engineering management. He is a publicity and development officer at the Faculty of Engineering at the University of Balamand, Lebanon, where he is responsible for coordinating faculty efforts aimed at developing opportunities for engineering students to sharpen their skills, enhance their educational experience, and interact with the community. He is also a Member of the IEEE as well as the IEEE Education Society and the IEEE Technology and Engineering Management Society.